

Borehole

30-11-11Log Event **A****Borehole Information**

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|-------------------------|---------------------------------|----------------------------------|
| Farm : <u>C</u> | Tank : <u>C-111</u> | Site Number : <u>299-E27-106</u> |
| N-Coord : <u>43,043</u> | W-Coord : <u>48,495</u> | TOC Elevation : <u>646.00</u> |
| Water Level, ft : | Date Drilled : <u>4/30/1975</u> | |

Casing Record

| | | |
|----------------------------|--------------------------------|--------------------|
| Type : <u>Steel-welded</u> | Thickness, in. : <u>0.280</u> | ID, in. : <u>6</u> |
| Top Depth, ft. : <u>0</u> | Bottom Depth, ft. : <u>100</u> | |

Borehole Notes:

This borehole was drilled in April 1975 and completed to a depth of 100 ft with 6-in.-diameter casing (Chamness and Merz 1993). A driller's log is not available for this borehole. Chamness and Merz (1993) make no mention of perforations or grouting; therefore, it is assumed that the casing is not perforated or grouted. The casing thickness is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. casing.

The top of the casing is the zero reference for the log. The casing lip is approximately even with the ground surface.

Equipment Information

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|-----------------------------------|---|--|
| Logging System : <u>1B</u> | Detector Type : <u>HPGe</u> | Detector Efficiency: <u>35.0 %</u> |
| Calibration Date : <u>02/1997</u> | Calibration Reference : <u>GJO-HAN-13</u> | Logging Procedure : <u>P-GJPO-1783</u> |

Log Run Information

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|---------------------------------|----------------------------------|---------------------------------------|
| Log Run Number : <u>1</u> | Log Run Date : <u>03/10/1997</u> | Logging Engineer: <u>Alan Pearson</u> |
| Start Depth, ft.: <u>0.0</u> | Counting Time, sec.: <u>100</u> | L/R : <u>L</u> Shield : <u>N</u> |
| Finish Depth, ft. : <u>14.0</u> | MSA Interval, ft. : <u>0.5</u> | Log Speed, ft/min.: <u>n/a</u> |

| | | |
|---------------------------------|----------------------------------|---------------------------------------|
| Log Run Number : <u>2</u> | Log Run Date : <u>03/11/1997</u> | Logging Engineer: <u>Alan Pearson</u> |
| Start Depth, ft.: <u>99.5</u> | Counting Time, sec.: <u>100</u> | L/R : <u>L</u> Shield : <u>N</u> |
| Finish Depth, ft. : <u>54.0</u> | MSA Interval, ft. : <u>0.5</u> | Log Speed, ft/min.: <u>n/a</u> |

| | | |
|---------------------------------|----------------------------------|---------------------------------------|
| Log Run Number : <u>3</u> | Log Run Date : <u>03/12/1997</u> | Logging Engineer: <u>Alan Pearson</u> |
| Start Depth, ft.: <u>55.0</u> | Counting Time, sec.: <u>100</u> | L/R : <u>L</u> Shield : <u>N</u> |
| Finish Depth, ft. : <u>13.0</u> | MSA Interval, ft. : <u>0.5</u> | Log Speed, ft/min.: <u>n/a</u> |

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|---------------------|-------------|----------------------|-------------------|---------------------|---------------------|
| Log Run Number : | <u>4</u> | Log Run Date : | <u>03/12/1997</u> | Logging Engineer: | <u>Alan Pearson</u> |
| Start Depth, ft.: | <u>15.0</u> | Counting Time, sec.: | <u>100</u> | L/R : <u>L</u> | Shield : <u>N</u> |
| Finish Depth, ft. : | <u>0.0</u> | MSA Interval, ft. : | <u>0.5</u> | Log Speed, ft/min.: | <u>n/a</u> |

Analysis Information

Analyst : H.D. Mac LeanData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 09/05/1997

Analysis Notes :

The SGLS log of this borehole was completed in four logging runs. Three logging runs were required to complete the log of the borehole. The fourth logging run repeated a segment of the borehole that had been logged earlier as an additional quality assurance check and to observe the repeatability of the radionuclide concentration measurements.

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration that best matched the logging run data were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging runs. There was negligible gain drift during the logging runs and it was not necessary to adjust the established channel-to-energy parameters to maintain proper peak identification.

Casing correction factors for a 0.280-in.-thick casing were applied during the analysis.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected only at the ground surface. The measured concentration of the Cs-137 surface occurrence was about 10 pCi/g.

The logs of the naturally occurring radionuclides show that the K-40 concentrations increase from a background of about 14 pCi/g above 38.5 ft to about 16 pCi/g between depths of 39 and about 59 ft. Below the 59-ft depth, the K-40 concentrations continue to increase to a background of about 17.5 pCi/g. The U-238 concentrations also increase to a slightly higher background below the 59-ft depth.

Details concerning the interpretation of data for this borehole are presented in the Tank Summary Data Report for tank C-111.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the



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spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A separate plot of the repeated segment of the log shows the concentrations of the naturally occurring radionuclides measured by the original and repeated logging runs. The uncertainty of each measurement is indicated on the plot. The measured concentrations are generally within the two sigma (95 percent) confidence level of the measurements.